

## Abstract

A system, device, and method for initial ranging dynamically adjusts the backoff window size used during a ranging and adjustment process in an attempt to maximize the probability of success outcomes during contention access. The adaptive initial ranging scheme takes a first system performance measurement using a first backoff window size, takes a second system performance measurement using a second backoff window size different than the first backoff window size, and determines a third backoff window size based on the first and second system performance measurements. More specifically, the adaptive initial ranging scheme first provides ranging opportunities and specifies a first backoff window size for collision resolution, counts a first number of success outcomes in a first sample of ranging opportunity slots, and determines a first probability of success outcomes. The adaptive initial ranging scheme then provides additional ranging opportunities and specifies a second backoff window size for collision resolution, skips a number of ranging opportunity slots at least equal to the first backoff window size, counts a second number of success outcomes in a second sample of ranging opportunity slots, determines a second probability of success outcomes, determines a ratio  $R$  having a numerator equal to the second probability of success outcomes minus the first probability of success outcomes and a denominator equal to the second backoff window size minus the first backoff window size, and selects a third backoff window size based on at least the ratio  $R$ .

"Express Mail" ELO 3400 478345

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